CLAIMS

1. Apparatus for modifying a power flow in a segment of an electric power line, each segment including phase lines each having n conductors electrically insulated from one another and short-circuited at ends of the segment, the apparatus comprising a power exchange unit including:

a power converter for converting power between first and second pairs of terminals, the first pair of terminals being connected in series with at least one conductor of the segment; and

an electric component connected to the second pair of terminals and capable of circulating power through the power converter for modifying said power flow.

2. Apparatus according to claim 1, wherein the power exchange unit further comprises a switch for selectively connecting and disconnecting the first pair of terminals in series with said at least one conductor of the segment, in response to control signals.

3. Apparatus according to claim 2, comprising n-1 power units connectable by means of their switch respectively to n-1 conductors of a phase line belonging to the segment.

4. Apparatus according to claim 2, comprising at least one additional power unit for forming a set of n power units, the n power units being connectable by means of their switch respectively to n conductors of a phase line belonging to the segment.

5. Apparatus according to claim 2, comprising an additional power unit for forming a set of two power units, the two power units being connectable by means of their switch respectively to conductors of two phase lines belonging respectively to said segment and to another segment, the two power units sharing a common electric component for allowing a power flow between the two segments.

6. Apparatus according to claim 5, wherein the switch of each power unit is able to connect and disconnect, for the corresponding phase line, n-1 conductors that are short-circuited among each other on each side of the switch.

7. Apparatus according to claim 5, wherein the switch of each power unit is able to connect and disconnect, for the corresponding phase line, more than one and at most n-1 conductors that are short-circuited among each other on each side of the switch.

8. Apparatus according to claim 2, wherein the switch is able to connect and disconnect more than one and at most n-1 conductors of a phase line belonging to the segment, said more than one and at most n-1 conductors being short-circuited among each other on each side of the switch.

9. Apparatus according to claim 2, comprising at least one additional power unit for forming a first set of n-1 power units, the switches of the n-1 power units being able to connect and disconnect respectively n-1 conductors of a phase line belonging to the segment, said n-1 conductors being short-circuited among each other on a side of the switches.

10. Apparatus according to claim 9, comprising at least one additional power unit for forming a second set of n-1 power units, the switches of the

n-1 power units of the second set being able to connect and disconnect respectively n-1 conductors of a second phase line belonging to another segment, said n-1 conductors of the second phase line being short-circuited among each other on a side of the corresponding switches, the first and second sets of power units sharing common electric components for allowing a power flow between the two segments.

11. Apparatus according to claim 1, wherein the electric component is selected among the following components: a capacitor, a battery, an inductance, a resistance, and a resistance connected in parallel to a capacitor.

12. Method for modifying a power flow in a segment of an electric power line, each segment having phase lines each having n conductors insulated from one another and short-circuited at ends of the segment, the method comprising the following steps:

a) providing a power unit having a power converter for converting power between first and second pairs of terminals, and an electric component connected to the second pair of terminals and capable of circulating power through the power converter, the first pair of terminals being connected in series with at least one conductor of the segment; and

b) converting power between the first and second pairs of terminals by means of the power converter for modifying said power flow.

13. Method according to claim 12, further comprising step c) of selectively connecting and disconnecting the first pair of terminals in series with said at least one conductor of the segment, by means of the switch in response to control signals, said switch being part of the power unit.

14. Method according to claim 13, wherein:

in step a), n-1 power exchange units are provided;

in step b), the power is converted by at least one of the n-1 power converters; and

in step c), the n-1 power units are connected and disconnected by means of their switch respectively to n-1 conductors of a phase line belonging to the segment.

15. Method according to claim 13, wherein:

in step a), at least one additional power unit is provided for forming a set of n power units;

in step b), the power is converted by at least one of the n power converters; and

in step c), the n power units are connected and disconnected by means of their switch respectively to n conductors of a phase line belonging to the segment.

16. Method according to claim 13, wherein:

in step a), an additional power unit is provided for forming a set of two power units;

in step b), the power is converted by means of two power converters; and

in step c), the two power units are connected and disconnected by means of their switch respectively to conductors of two phase lines belonging respectively to said segment and to another segment, the two power units sharing a common electric component for allowing a power flow between the two segments.

17. Method according to claim 16, wherein in step c), the switch of each power unit connects and disconnects, for the corresponding phase line, n-1

conductors that are short-circuited among each other on each side of the switch.

18. Method according to claim 16, wherein in step c), the switch of each power unit connects and disconnects, for the corresponding phase line, more than one and at most n-1 conductors that are short-circuited among each other on each side of the switch.

19. Method according to claim 13, wherein in step c), the switch connects and disconnects more than one and at most n-1 conductors of a phase line belonging to the segment, said more than one and at most-1 conductors being short-circuited among each other on each side of the switch.

20. Method according to claim 13, wherein:

in step a), at least one additional power unit is provided for forming a first set of n-1 power units;

in step b), the power is converted by at least one of the n-1 power converters; and

in step c), the n-1 power units are connected and disconnected by means of their switch respectively to n-1 conductors of a phase line belonging to the segment, said n-1 conductors being short-circuited among each other on a side of the switches.

21. Method according to claim 20, wherein:

in step a), at least one additional power unit is provided for forming a second set of n-1 power units;

in step b), the power is converted by at least two of the power converters that belong respectively to the first and second sets and that are linked by a common electric component; and

in step c), the n-1 power units of the second set are connected and disconnected by means of their switch respectively to n-1 conductors of a phase line belonging to a second segment, said n-1 conductors of the phase line belonging to the second segment being short-circuited among each other on a side of the corresponding switches, said at least two power converters allowing a power flow between the two segments.